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# Risk factors for new depressive episodes in primary health care: an international prospective 12-month follow-up study

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## ABSTRACT

**Background.** Studies that examined community samples have reported several risk factors for the development of depressive episodes. The few studies that have been performed on primary care samples were mostly cross-sectional. Most samples had originated from highly developed industrial countries. This is the first study that prospectively investigates the risk factors of depressive episodes in an international primary care sample.

**Methods.** A stratified primary care sample of initially non-depressed subjects ($N = 2445$) from 15 centres from all over the world was examined for the presence or absence of a depressive episode (ICD-10) at the 12 month follow-up assessment. The initial measures addressed sociodemographic variables, psychological/psychiatric problems and social disability. Logistic regression analysis was carried out to determine their relationship with the development of new depressive episodes.

**Results.** At the 12-month follow-up, 4·4% of primary care patients met ICD-10 criteria for a depressive episode. Logistic regression analysis revealed that the recognition by the general practitioner as a psychiatric case, repeated suicidal thoughts, previous depressive episodes, the number of chronic organic diseases, poor general health, and a full or subthreshold ICD-10 disorder were related to the development of new depressive episodes.

**Conclusions.** Psychological/psychiatric problems were found to play the most important role in the prediction of depressive episodes while sociodemographic variables were of lower importance. Differences compared with other studies might be due to our prospective design and possibly also to our culturally different sample. Applied stratification procedures, which resulted in a sample at high risk of developing depression, might be a limitation of our study.

## INTRODUCTION

About 5 to 10% of the US-American and European primary health care population suffer from a major depression (Katon, 1987; Katon & Schulberg, 1992; Pini *et al.* 1999). General practitioners play an important role in the treatment of depressive disorders by taking care of many depressed individuals (Regier *et al.* 1993; Pincus *et al.* 1998). Knowing the risk factors can help general practitioners to plan preventive actions. Many studies have examined prevalence rates and risk factors of depressive disorders in general population samples (e.g. Rorsman *et al.* 1990; Coryell, 1992; Wilhelm *et al.* 1999; Lindeman *et al.* 2000; Sakado *et al.* 2000). It is not self-evident that findings from the community can be extrapolated to primary care patients because the samples may differ in the nature and severity of the depressive disorder (Wohlfarth *et al.* 1993). Only a few studies were concerned with risk factors of depressive disorders in primary care attenders (Wright *et al.* 1980; Salokangas & Poutanen, 1998; Van den Berg *et al.* 2000). Observed risk factors were: a

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low socio-economic status; recent stress; use of birth control pills; a serious physical illness; distant life events (Wright *et al*. 1980); negative life events, poor physical health, poor interpersonal relationships, spouse's poor health, a poor socio-economic and work situation, and problems with alcohol (Salokangas & Poutanen, 1998); female gender, psychological distress, impairment of hearing, vision and mobility, disabilities in physical role and social functioning, increased neuroticism, reduced extraversion, reduced mastery and reduced self-efficacy (Van den Berg *et al*. 2000). The main shortcoming of these studies is their correlational nature: depression status and risk factors are measured at the same time-point (one recent study of Verdoux *et al*. (1999) used a prospective design but concentrated only on psychosis-proneness). Thus, important variables were only retrospectively assessed, which can result in answers being biased by the depressive state of the subjects (see also Van den Berg *et al*. 2000).

The aim of this study is to identify risk factors for the development of depressive episodes in a prospective design. Therefore, data from the World Health Organization (WHO) collaborative study on 'Psychological Problems in General Health Care' (Üstün & Sartorius, 1995) were analysed. The prospective character of this study and the selection of non-depressed subjects allow for the identification of risk factors not influenced by the biased answers in retrospective designs.

In general, studies concerned with risk factors for depressive disorders examined persons living in our modern Western world, thereby ignoring the people of developing countries. The present study examined patients from 15 sites in 14 countries from all over the world. An international generalization might therefore be possible.

## METHOD

### Subjects

The WHO Collaborative Study on 'Psychological Problems in General Health Care' is a cross-sectional and prospective–longitudinal study conducted to explore the frequency, recognition, management and 12-month course and outcome of different mental disorders in general health care. Its design and the standardized assessment procedure have been described in detail elsewhere (Sartorius *et al*. 1993; Ormel *et al*. 1994; Von Korff & Üstün, 1995; Üstün & Sartorius, 1995; Üstün & Von Korff, 1995) and will only be reviewed here in brief: the study sample consisted of patients attending the participating general health care facilities. Patients were excluded if they were younger than the age of majority (in general 18 years), were older than 65, were too ill for the screening procedure, had no fixed address, did not come for a medical consultation, had a communication problem, and gave no informed consent.

The study used a prospective cross-cultural design in which 15 centres (see Table 1) in 14 countries from different continents (Africa, Asia, Europe, North America, South America) participated, representing a broad diversity of cultures and socioeconomic development. The centres were selected on the basis of previous successful collaboration with the WHO, experience with research in primary care settings, access to primary care patient population, availability of appropriately skilled personnel to ensure full adherence to the study protocol and approval for the study by local ethic committees. At each of the 15 participating centres, 1300 to 2800 consecutive attenders of primary health care facilities were screened using the 12-item General Health Questionnaire (GHQ; Goldberg & Williams, 1988). Using centre specific GHQ score norms, patients were placed in a low GHQ score stratum (approximately 60% of consecutive patients in a particular centre), a medium GHQ score stratum (20% of patients), or a high GHQ score stratum (20% of patients). All high GHQ scorers, 35% of medium scorers and 10% of low scorers were randomly sampled for the baseline diagnostic assessment. After the baseline assessment, the protocol required follow-up of a 20% random sample of all persons completing the initial interview, and all persons meeting pre-specified criteria for definite of subthreshold disorders as assessed by the CIDI (Division of Mental Health, 1990) – Primary Health Care Version. This report includes all patients completing both the baseline and follow-up assessment.

We were interested in the development of new depressive episodes. Consequently, patients with a depressive episode at the baseline assessment were excluded from our study. Diagnosis of a

depressive episode was made according to ICD-10 (WHO, 1992). Additional psychiatric diagnoses were allowed since the effects of psychiatric disorders on outcome should be examined.

## Measures

### *Composite International Diagnostic Interview – Primary Health Care Version*

The Composite International Diagnostic Interview – Primary Health Care Version (CIDI-PHC) is a modification of the Composite International Diagnostic Interview (CIDI; Division of Mental Health, 1990). The CIDI-PHC was used at baseline and at the 12-month follow-up assessment to obtain detailed standard demographic information, data about the main reason for contact, pathways to general health care, chronic diseases and received medications. The CIDI-PHC contains a symptomatic evaluation of several mental disorders: somatization; hypochondriasis; neurasthenia; current anxiety; panic disorder; agoraphobia; depression; memory disorder; alcohol use. The joint-rater reliability coefficient (across different centres) for diagnoses was 0·92 overall. All interviewers were trained by at least one English-speaking individual who had participated in a 5-day central training session (Von Korff & Üstün, 1995).

### *Social Disability Schedule – Global Score*

To assess social disability in occupational roles and daily activities the Social Disability Schedule (SDS; Wiersma *et al.* 1988) was applied. The global score of the SDS is based on the interviewer rating of the patient's adjustment to daily routine, energy input and performance, contact with people at work and other relevant daily activities. Regarding the patient's performance, the interviewer was able to take into consideration the specific social norms of the different participating centres. The joint-rater reliability coefficient (across different centres) was 0·85 overall.

## Dependent and independent variables

The specific outcome or dependent variable for our analysis was the presence or absence of a depressive episode at the 12-month follow-up as assessed with the CIDI-PHC. As at the baseline assessment, diagnosis was based on ICD-10 criteria of depressive episode (see below). Exactly the same symptomatic questions as at the baseline assessment were posed. The 1 year retest assessments were made by interviewers who were blind and independent of the initial assessment.

One independent variable was the presence of a lifetime depressive episode according to ICD-10 as diagnosed at the baseline assessment. That is, every patient was not only asked for current depressive symptoms but also whether he ever suffered from at least two symptoms of: (*a*) depressed mood, (*b*) loss of interest or pleasure and (*c*) decreased energy/increased fatigability; and at least two symptoms of (*a*) loss of confidence/self-esteem, (*b*) unreasonable feelings of self-reproach/excessive inappropriate guilt, (*c*) recurrent thoughts of death or suicide/suicidal behaviour, (*d*) diminished ability to think or concentrate, (*e*) agitation or retardation, (*f*) sleep disturbance, and (*g*) appetite change/weight change and whether the symptoms necessary for the diagnosis of a depressive episode occurred in the same period. The independent variables, i.e. possible risk factors for the development of a depressive episode, taken from the baseline assessment with the CIDI-PHC and SDS are presented in Tables 1 to 3. To include suicidal tendencies, we took one item from the 34-item version of the GHQ (Goldberg & Williams, 1988), which measures repeated suicidal thoughts in the last weeks. The proband should answer it using a 4-step rating scale ranging from 0 ('definitely absent') to 3 ('definitely present'). To take into account stratification of the sample at the baseline assessment, the GHQ-stratum (I (low stress), II (medium stress), III (high stress)) was considered as an additional potential predictor. A variable that summarizes the diagnostic status of the patient ('well', 'symptomatic', 'sub-threshold', 'alcohol only', 'ICD-10 current disorder') was also included as independent variable because the second stratification for the follow-up assessment was carried out on the basis of this variable.

## Statistical analysis

The prediction of a depressive episode depends on the selection of possible risk factors for analysis. To identify individual risk factors comparable with other studies, we carried out

Table 1. *Sociodemographic characteristics of initially non-depressed patients classified by presence of ICD-10 diagnosis of depressive episode at 12-months follow-up*

| Characteristic at baseline | At follow-up: Depressed *N* (%) | At follow-up: Non-depressed *N* (%) | OR (95% CI) |
|---|---|---|---|
| Sex | | | |
| Female | 128 (69·2) | 1415 (63·1) | 1·32 (0·95–1·82) |
| Age | | | |
| 15–24 | 19 (10·3) | 304 (13·5) | 1·00 |
| 25–34 | 37 (20·0) | 544 (24·2) | 1·09 (0·61–1·92) |
| 35–44 | 44 (23·8) | 503 (22·4) | 1·4 (0·80–2·44) |
| 45–54 | 47 (25·4) | 447 (19·9) | 1·68 (0·97–2·92) |
| 55–65 | 38 (20·5) | 446 (19·9) | 1·36 (0·77–2·40) |
| Marital state** | | | |
| Married | 97 (52·4) | 1398 (62·3) | 1·00 |
| Widowed | 12 (6·5) | 110 (4·9) | 1·57 (0·84–2·95) |
| Separated | 12 (6·5) | 67 (3·0) | 2·58 (1·35–4·93) |
| Divorced | 22 (11·9) | 142 (6·3) | 2·23 (1·36–3·66) |
| Never married | 42 (22·7) | 521 (23·2) | 1·16 (0·8–1·69) |
| Unknown | 0 (0) | 6 (0·3) | |
| Years of formal education** | | | |
| 0 | 19 (10·3) | 169 (7·5) | 1·00 |
| 1–5 | 21 (11·4) | 224 (10·0) | 0·83 (0·44–1·60) |
| 6–10 | 80 (43·2) | 748 (33·3) | 0·95 (0·56–1·61) |
| $\geqslant 11$ | 60 (32·4) | 1021 (45·5) | 0·52 (0·31–0·9) |
| Unknown | 5 (2·7) | 82 (3·7) | |
| Employment | | | |
| Employed | 76 (33·5) | 1108 (49·4) | 1·00 |
| Unemployed | 62 (41·1) | 625 (27·9) | 1·45 (1·02–2·05) |
| Housewife | 37 (20·0) | 371 (16·5) | 1·45 (0·97–2·19) |
| Unknown status | 10 (5·4) | 140 (6·2) | |
| Centre*** | | | |
| Ankara | 21 (11·4) | 152 (6·8) | 1·76 (1·09–2·86)* |
| Athens | 8 (4·3) | 95 (4·2) | 1·02 (0·49–2·14) |
| Bangalore | 12 (6·5) | 218 (9·7) | 0·65 (0·35–1·18) |
| Berlin | 21 (11·4) | 238 (10·6) | 1·08 (0·67–1·73) |
| Groningen | 9 (4·9) | 124 (5·5) | 0·87 (0·44–1·75) |
| Ibadan | 11 (5·9) | 85 (3·8) | 1·61 (0·84–3·07) |
| Mainz | 13 (7·0) | 190 (8·5) | 0·82 (0·46–1·46) |
| Manchester | 29 (15·7) | 134 (6·0) | 2·93 (1·9–4·51)*** |
| Nagasaki | 5 (2·7) | 162 (7·2) | 0·36 (0·15–0·88)* |
| Paris | 14 (7·6) | 175 (7·8) | 0·97 (0·55–1·71) |
| Rio de Janeiro | 7 (3·8) | 57 (2·5) | 1·51 (0·68–3·36) |
| Santiago de Chile | 12 (6·5) | 50 (2·2) | 3·04 (1·59–5·82)*** |
| Seattle | 13 (7·0) | 239 (10·7) | 0·63 (0·36–1·13) |
| Shanghai | 6 (3·2) | 221 (9·8) | 0·31 (0·13–0·70)** |
| Verona | 4 (2·2) | 104 (4·6) | 0·46 (0·17–1·25) |
| Total | 185 | 2244 | |

Overall $\chi^2$ tests were applied and marked if significant.
Additionally, for the centre-variable single $\chi^2$ tests (one centre *v.* not this centre) were applied and marked if significant.
* $P < 0{\cdot}05$; ** $P < 0{\cdot}01$; *** $P < 0{\cdot}001$.

univariate analyses using non-parametric tests ($\chi^2$ or Fisher's exact tests). The odds ratios for the development of a depressive episode and their 95% confidence intervals were calculated. For variables with more than two categories a reasonable reference category was defined. The centre variable and the variable that measured main reasons for consulting the general practitioner were treated in a different manner: every single category was tested against all other categories.

To account for the influence exerted by the stratification procedures we included the GHQ stratum (as basis for the stratification before the baseline assessment) and the diagnostic status (as basis for the stratification before the follow-up assessments) in the univariate and logistic regression analysis.

Forward and backward stepwise logistic regression analysis was applied to identify the most relevant variables and to examine the simultaneous effects of all variables. The final model was corrected at the end by including sex, age and all centres in the model. Tests were always two-tailed with a significance level of $P < 0{\cdot}05$.

To obtain incidence rates not influenced by the two selection procedures before the baseline and the follow-up assessment and by differences in response rates by several attributes we applied a twofold reweighting procedure. First, weights were adjusted to account for varying probabilities of selection for the baseline assessment by GHQ score group as well as for differences in response rates by gender and GHQ score (sample weights were not stratified by age because non-response did not differ by age). The sample weight for a given gender-GHQ score group was estimated by dividing the number of people screened in that stratum by the number of persons completing the baseline assessment in the same gender-GHQ score stratum. Since it was desirable to have the weighted size of the second stage sample equal to the number of persons completing the baseline examination, the sample weights were multiplied by the ratio of the total number of persons interviewed to the total number of persons screened. Secondly, weights, analogously, were calculated to account for varying probabilities of selection for the follow-up assessment by diagnostic status (definite and subthreshold disorders *versus* no disorder) at the baseline assessment as well as for differences in response rates by age, gender and diagnostic status. Again, the sample weights were multiplied by the ratio of the total number of persons followed up to the total number of persons interviewed at baseline. The two different weights were multiplied.

## RESULTS

### Sampling procedure

After the initial screening procedure with the 12-item General Health Questionnaire (GHQ; Goldberg & Williams, 1988) a total of 25916 subjects resulted (response rate = 96·5%). Following the stratification procedure according to centre specific GHQ score norms, a total of 5438 patients (average response rate = 64·9%) completed the baseline diagnostic assessment. Of eligible patients for the follow-up assessment (all current and subthreshold disorders + 20% random sample of healthy individuals) across all sites 69·3% (a total of 2829 patients) completed the 12-month assessment. Most of the centres followed up slightly more than a 20% random sample of individuals healthy at the baseline assessment so that a total of 3201 patients could be followed up. This sample is composed of 1810 subjects with a definite or subthreshold ICD-10 disorder and 1391 subjects with no mental disorder or only single symptoms at the baseline assessment.

From all 15 centres a total of 2445 subjects (of 3201) were identified not to meet ICD-10 criteria for a depressive episode at the baseline assessment. A small number of subjects ($N = 16$) were not fully assessed at the 12-month follow-up so that it remained unclear whether they met the criteria of depression or not. They were excluded from further analysis.

### Characteristics of the sample

The sample characteristics at the baseline assessment are given in Tables 1 to 3 differentiating between subjects with or without a depression at the 12-month follow-up. The overall proportion of females (63·5%) was comparable to those observed in other studies with primary care samples examining risk factors for depression (Salokangas & Poutanen, 1998). The age range was 15 to 65 years (mean = 40·65; S.D. = 13·45). The duration of formal education ranged from 0 to 30 years (mean = 9·9; S.D. = 4·85), thus reflecting the different cultural and socio-economic environments in which the international study took place.

When assessed after 12 months, 7·6% met ICD-10 criteria for a new depressive episode. Considering the two selection strategies before the baseline and the follow-up assessment by applying the weighting procedure described above we found a rate of 4·4% of newly depressed patients in our primary care sample.

### The identification of risk factors for the development of depressive episodes

*Individual risk factors in univariate analyses*

*Sociodemographic variables*

Marital state and years of formal education were significantly associated with the development

Table 2. *Psychological/psychiatric problems of initially non-depressed patients classified by presence of ICD-10 diagnosis of depressive episode at 12 months follow-up*

| Characteristic at baseline | At follow-up: Depressed *N* (%) | At follow-up: Non-depressed *N* (%) | OR (95% CI) |
|---|---|---|---|
| Presence of a psychiatric disorders (ICD-10) | | | |
| Dysthymia | 13 (7·0) | 60 (2·7) | 2·76 (1·48–5·12)** |
| Agoraphobia | 11 (5·9) | 35 (1·6) | 4·22 (2·11–8·47)***† |
| Panic disorder | 7 (3·8) | 18 (0·8) | 4·90 (2·02–11·89)**† |
| Generalized anxiety disorder | 44 (23·8) | 199 (8·9) | 3·35 (2·31–4·85)*** |
| Neurasthenia | 26 (14·1) | 135 (6·0) | 2·59 (1·65–4·06)*** |
| Somatization disorder | 13 (7·0) | 40 (1·8) | 4·18 (2·19–7·96)***† |
| Pain disorder | 55 (29·7) | 400 (17·8) | 1·94 (1·39–2·71)*** |
| Hypochondriasis | 2 (1·1) | 25 (1·1) | 0·97 (0·23–4·12)† |
| Alcohol (harmful use/dependence) | 22 (11·9) | 132 (5·9) | 2·16 (1·34–3·49)** |
| Use of antidepressants | 16 (8·6) | 75 (3·3) | 2·62 (1·49–4·6)** |
| Use of hypnotics | 18 (9·7) | 77 (3·5) | 2·94 (1·72–5·03)*** |
| Use of sedatives | 18 (9·7) | 131 (5·9) | 1·64 (0·98–2·76) |
| Use of major tranquilizers | 6 (3·2) | 45 (2·0) | 1·57 (0·66–3·74)† |
| Recognition of a psychiatric disorder by general practitioner | 91 (49·2) | 584 (26·9) | 2·75 (2·02–3·73)*** |
| Social Disability Schedule*** | | | |
| No disability | 46 (24·9) | 1098 (45·2) | 1·00 |
| Some disability | 69 (37·3) | 806 (33·2) | 2·15 (1·46–3·18) |
| Moderate disability | 55 (29·7) | 435 (17·9) | 3·32 (2·2–5·01) |
| Severe disability | 15 (8·1) | 90 (3·7) | 4·7 (2·50–8·82) |
| Repeated suicidal thoughts*** | | | |
| Definitely not | 113 (61·1) | 1824 (81·3) | 1·00 |
| I don't think so | 42 (22·7) | 296 (13·2) | 2·25 (1·54–3·29) |
| Crossed my mind | 25 (13·5) | 117 (5·2) | 3·51 (2·19–5·63) |
| Definitely has/have | 5 (2·7) | 7 (0·3) | 11·54 (3·60–36·93) |
| Previous episodes of depression | 56 (30·3) | 362 (16·1) | 2·26 (1·62–3·15)*** |
| GHQ stratum for baseline assessment*** | | | |
| Low stratum | 13 (7·0) | 469 (20·9) | 1·00 |
| Medium stratum | 26 (14·1) | 597 (26·6) | 1·57 (0·8–3·09) |
| High stratum | 146 (78·9) | 1178 (52·5) | 4·47 (2·51–7·96) |
| Diagnostic status*** | | | |
| Well | 8 (4·3) | 500 (22·3) | 1·00 |
| Symptomatic | 45 (24·3) | 821 (36·6) | 3·41 (1·6–7·29) |
| subthreshold | 36 (19·5) | 399 (17·8) | 5·62 (2·59–12·20) |
| Alcohol only | 9 (4·9) | 102 (4·5) | 5·49 (2·07–14·56) |
| ICD-10 current disorder | 87 (47·0) | 422 (18·8) | 12·83 (6·16–26·75) |
| Total | 185 | 2244 | |

Overall $\chi^2$ tests were applied and marked if significant.
† In case of too small sample sizes in at least one group Fisher's exact test was applied.
* $P < 0{\cdot}05$; ** $P < 0{\cdot}01$; *** $P < 0{\cdot}001$.

of depression (see Table 1). Separated and divorced subjects were at higher risk of developing a depressive episode. Subjects with more than 10 years of formal education showed a decreased risk of depression development. Although there was no significant overall difference between the two outcome groups with regard to employment status, unemployed persons were at a slightly higher risk of developing a depressive episode. Few site effects were found: people living in Ankara, Manchester and Santiago de Chile showed a higher risk of depression development while people living in Nagasaki and Shanghai were at lower risk.

### *Psychological/psychiatric problems*

Rates of dysthymia, agoraphobia, panic disorder, generalized anxiety disorder, neurasthenia, somatization disorder, pain disorder, problems with alcohol at baseline and previous depressive episodes were more frequent in patients who developed a depressive episode

Table 3. *Reasons for consulting the general practitioner/chronic organic diseases of initially non-depressed patients classified by presence of ICD-10 diagnosis of depressive episode at 12 months follow-up*

| Characteristic at baseline | At follow-up | | OR (95% CI) |
|---|---|---|---|
| | Depressed *N* (%) | Non-depressed *N* (%) | |
| Main reason for consulting the general practitioner*† | | | |
| Depression related | 12 (6·5) | 39 (1·7) | 3·8 (1·95–7·39)***† |
| Anxiety related | 5 (2·7) | 42 (1·9) | 1·40 (0·55–3·61)† |
| Other neurotic | 3 (1·6) | 20 (0·9) | 1·77 (0·52–6·02)† |
| Psychotic symptoms | 1 (0·5) | 3 (0·1) | 3·93 (0·41–37·95)† |
| Fits | 4 (2·2) | 2 (0·1) | 0·07 (0·00–8676098·5)† |
| Other organic | 4 (2·2) | 8 (0·4) | 0·02 (0·00–117098·08)† |
| Interpersonal problems | 3 (1·6) | 5 (0·2) | 7·14 (1·69–30·13)*† |
| Other disturbed | 0 (0) | 2 (0·1) | 0·07 (0·00–8676098·5)† |
| Drug related | 0 (0) | 1 (0·04) | 0·07 (0·00–$2{\cdot}01 \cdot 10^{10}$)† |
| Headache | 11 (5·9) | 104 (4·6) | 1·26 (0·66–2·39) |
| Abdominal pain | 13 (7·0) | 170 (7·6) | 0·89 (0·5–1·6) |
| Back/chest pain | 21 (11·4) | 208 (9·3) | 1·21 (0·75–1·95) |
| Other pain | 20 (10·8) | 214 (9·5) | 1·11 (0·68–1·80) |
| Weakness/lethargy | 2 (1·1) | 75 (3·3) | 0·31 (0·07–1·25) |
| Fever | 0 (0) | 30 (1·3) | 0·01 (0·00–4293·16)† |
| Dizziness | 2 (1·1) | 54 (2·4) | 0·43 (0·10–1·77)† |
| Loss of weight | 0 (0) | 2 (0·1) | 0·07 (0·00–8676098·5)† |
| Sleep disturbance | 1 (0·5) | 36 (1·6) | 0·32 (0·04–2·36)† |
| Cough/cold/flu | 14 (7·6) | 201 (9·0) | 0·80 (0·46–1·41) |
| Genito-urinary | 10 (5·4) | 95 (4·2) | 1·25 (0·64–2·44) |
| Other somatic | 28 (15·1) | 350 (15·6) | 0·93 (0·61–1·41) |
| Ante/post-natal | 1 (0·5) | 11 (0·5) | 1·07 (0·14–8·31)† |
| Family planning | 4 (2·2) | 9 (0·4) | 0·02 (0·00–48483·29)† |
| Other | 34 (18·4) | 443 (19·7) | 0·88 (0·6–1·29) |
| Number of chronic organic diseases** | | | |
| 0 | 64 (34·8) | 845 (37·7) | 1·00 |
| 1 | 45 (24·5) | 759 (33·9) | 0·78 (0·53–1·16) |
| ⩾ 2 | 75 (40·8) | 638 (28·5) | 1·55 (1·1–2·2) |
| Total | 185 | 2244 | |

For the main reasons for consulting the general practitioner an overall Fisher's exact test was applied which was significant ($P < 0{\cdot}05$). Additionally, single $\chi^2$ tests or in case of too small sample sizes in one group – Fisher's exact tests (†) (one reason *v.* not this reason) were applied and marked if significant. For the number of chronic organic diseases an overall $\chi^2$ test was applied which was significant ($P < 0{\cdot}01$).
* $P < 0{\cdot}05$; ** $P < 0{\cdot}01$; *** $P < 0{\cdot}001$.

after 1 year (see Table 2). These subjects showed greater antidepressant and hypnotic use and had been more readily recognized as psychiatric cases by the general practitioners. There were significant proportion differences regarding social disability and 'Repeated suicidal thoughts'. Patients with some, moderate and severe social disability at baseline showed increased risk for the development of a depressive episode. The risk for depression development was increased in all patients who did not definitely deny repeated suicidal thoughts. Concerning GHQ-stratum (before the baseline assessment), patients in the high stratum showed a significantly increased risk of developing a depressive episode. With regard to diagnostic status, patients with single symptoms, a subthreshold psychiatric disorder, alcohol related problems, or an ICD-10 current disorder were at higher risk of developing a depressive episode and patients suffering from a current ICD-10 disorder showed the highest risk.

### *Organic diseases/main reasons for consulting the general practitioner*

Patients who consulted the general practitioner for depression related or interpersonal problems at the baseline assessment showed an increased risk of developing a depressive episode as represented in the odds ratios (see Table 3). Subjects depressed at follow-up had more chronic organic diseases than those non-depressed at follow-up. The risk of developing a depressive episode was increased for those patients having more than one chronic organic disease.

Table 4. *Risk factors for the development of new depressive episodes: summary of stepwise forward logistic regression analysis*

| Characteristic at baseline | OR (95% CI) |
|---|---|
| Recognition by the general practitioner | 1·55 (1·09–2·20)* |
| Repeated suicidal thoughts* | |
| Definitely not | 1·00 |
| I don't think so | 1·54 (1·00–2·36)* |
| Crossed my mind | 1·93 (1·15–3·24)* |
| Definitely has/have | 3·16 (0·86–11·6) |
| Previous depressive episodes | 1·74 (1·17–2·59)** |
| Number of chronic organic diseases* | |
| 0 | 1·00 |
| 1 | 0·77 (0·49–1·18) |
| ⩾ 2 | 1·39 (0·90–2·14) |
| GHQ stratum before baseline assessments** | |
| Low (low psychological stress) | 1·00 |
| Medium (medium psychological stress) | 1·09 (0·52–2·31) |
| High (high psychological stress) | 2·20 (1·12–4·33)* |
| Diagnostic status*** | |
| Well | 1·00 |
| Symptomatic | 1·93 (0·87–4·28) |
| Subthreshold | 2·42 (1·06–5·55)* |
| Alcohol only | 3·77 (1·36–10·47)* |
| ICD-10 current disorder | 4·75 (2·15–10·52)*** |
| Female gender | 1·09 (0·76–1·57) |
| Age | |
| 15–24 | 1·00 |
| 25–34 | 0·97 (0·53–1·79) |
| 35–44 | 1·31 (0·71–2·43) |
| 45–54 | 1·49 (0·8–2·78) |
| 55–65 | 1·13 (0·58–2·21) |
| Centre | |
| Ankara | 3·22 (1·74–5·94)*** |
| Athens | 2·47 (0·63–9·65) |
| Bangalore | 2·21 (0·65–7·51) |
| Berlin | 2·32 (0·75–7·19) |
| Groningen | 1·47 (0·42–5·19) |
| Ibadan | 4·79 (1·4–16·47)* |
| Mainz | 1·93 (0·59–6·31) |
| Manchester | 2·52 (1·46–4·36)** |
| Nagasaki | 0·96 (0·22–4·19) |
| Paris | 2·56 (0·77–8·50) |
| Rio de Janeiro | 2·20 (0·57–8·55) |
| Santiago de Chile | 3·09 (0·88–10·8) |
| Seattle | 1·61 (0·5–5·26) |
| Shanghai | 0·92 (0·24–3·52) |

Wald's $\chi^2$ test was applied and marked if significant.
The variable was marked if the overall Wald's $\chi^2$ test was significant.
* $P < 0{\cdot}05$; ** $P < 0{\cdot}01$; *** $P < 0{\cdot}001$.

### *Identification of risk factors by logistic regression analysis*

All variables were included in a stepwise logistic regression analysis. Table 4 presents the results of the forward stepwise logistic regression analysis corrected for sex, age and centre effects. The following variables showed independently significant positive relationships with the development of a depressive episode: recognition as a psychiatric case by the general practitioner; previous depressive episodes; and more than one chronic organic disease. People who answered the question regarding repeated suicidal thoughts with: 'I don't think so'; or, 'Crossed my mind' (*v.* 'Definitely not') had a significantly higher risk of developing a depressive episode. Persons who definitely had repeated suicidal thoughts showed the highest risk which surpassed the risks of all other categories even though this did not reach statistical significance. This is probably due to the small number of patients in this category. Patients with more than one chronic organic disease showed an increased risk but the odds ratios did not reach statistical significance. Patients of the high GHQ stratum (i.e. high psychological stress; before the baseline assessment) had a significantly higher risk to develop a depression. Patients with a subthreshold ICD-10 disorder, alcohol dependence/misuse, or full current ICD-10 disorder, showed an increased risk of developing a depressive episode (backward stepwise logistic regression produced nearly equivalent results).

Sex, age and most of the centres did not exert an important influence in the final logistic model. Patients from Ankara, Ibadan and Manchester were at higher risk to develop a depressive episode at the follow-up assessment than those of other centres.

The exclusion of patients who had previous depressive episodes produced nearly the same results in forward and backward stepwise logistic regression analysis. The use of hypnotics (OR = 2·17, 95% CI 1·05–4·51, corrected for age, sex and all centres) and depression related problems as main reason for consulting the general practitioner (OR = 4·82, 95% CI 1·81–12·84, corrected for age, sex and all centres) were additional variables in the final logistic models.

## DISCUSSION

To our knowledge, this is the first study that determines the risk factors of a new depressive episode for primary care patients in a prospective design. Moreover, because of the incorporation of subsamples differing in their cultural background our results might not be restricted to the Western population. The following variables

were independently associated with the development of a depressive episode: the recognition as psychiatric case by the general practitioner; repeated suicidal thoughts; previous depressive episodes; more than one chronic organic disease; a high score in the GHQ (high psychological stress) at the screening before the baseline assessment; and, a subthreshold or full current non-depressive ICD-10 disorder.

**Psychological/psychiatric problems**

A current full or subthreshold not further specified ICD-10 disorder was independently related to depression development after 1 year. This is probably the reason why no single disorder that showed a significant relationship in univariate analyses remained in the final logistic model. In cross-sectional designs with primary care patients a significant relationship between depression and somatization disorder (Brown *et al.* 1990) and depression and anxiety (Van den Berg *et al.* 2000) was found. The results presented herein go beyond these findings showing that unspecified full or subthreshold psychiatric disorders may precede depressive episodes. Moreover, in univariate analyses all incorporated psychiatric disorders except hypochondriasis increased the risk of depression development. Several studies with community samples showed a higher risk of developing a depressive episode for different psychiatric disorders: alcoholism, phobic disorder, or panic disorder (Coryell *et al.* 1992), depressive symptoms, dysthymia, panic disorder, or somatization disorder (Horwath *et al.* 1992).

The recognition of a psychiatric disorder by the general practitioner independently predicted the later onset of a depressive episode. The WHO study on 'Psychological Problems in General Health Care' has shown that there is only a moderate concordance in recognition between the general practitioner and the CIDI in our sample (Üstün & Von Korff, 1995). This possibly means that the general practitioner partly applies a different standard to psychiatric disorders. This would be an interesting topic for further research because in our analysis the diagnosis by the general practitioner predicted depressive episodes.

Previous depressive episodes were a risk factor for new depressive episodes. This result confirms the often reported finding that most patients with a depressive disorder experience more than one episode (e.g. Maj *et al.* 1992; Solomon *et al.* 2000) even though the reliability of self-reported lifetime depressive episodes might be limited (Andrews *et al.* 1999; Kendler *et al.* 2001).

Patients with or without previous depressive episodes were not differentiated in the main analysis. It is a regular occurrence that first incidence depressions are not separately examined (e.g. Salokangas & Poutanen, 1998; Forsell, 2000; Lindeman *et al.* 2000; Van den Berg *et al.* 2000). For a comparison of risk factors for first incidence and repeated depressive episodes larger study samples are needed.

The influence of suicidal tendencies on depression development has rarely been examined. In the present analysis suicidal thoughts were related to depression development in the final logistic model. This might be another reason why no single psychiatric disorder remained in the final logistic model: in the present study patients with dysthymia ($\chi^2 = 54{\cdot}222$, df = 3, $P = 0{\cdot}000$ (Fisher's exact test)), agoraphobia ($\chi^2 = 38{\cdot}183$, df = 3, $P = 0{\cdot}001$ (Fisher's exact test)), panic disorder ($\chi^2 = 12{\cdot}712$, df = 3, $P = 0{\cdot}014$ (Fisher's exact test)), generalized anxiety disorder ($\chi^2 = 45{\cdot}644$, df = 3, $P = 0{\cdot}000$), neurasthenia ($\chi^2 = 20{\cdot}792$, df = 3, $P = 0{\cdot}001$), somatization disorder ($\chi^2 = 39{\cdot}621$, df = 3, $P = 0{\cdot}000$ (Fisher's exact test)), pain disorder ($\chi^2 = 27{\cdot}853$, df = 3, $P = 0{\cdot}000$), or alcohol problems ($\chi^2 = 12{\cdot}114$, df = 3, $P = 0{\cdot}012$) significantly more often reported present suicidal thoughts than subjects without the respective disorder.

**Organic diseases**

The number of chronic organic diseases was a significant predictor of a depressive episode at the 12-month follow-up. This is consistent with findings of cross-sectional studies examining primary care patients (Wright *et al.* 1980; Van den Berg *et al.* 2000). Our design supports the idea that chronic organic diseases precede the onset of a depressive disorder. Previously conducted prospective studies with community samples came to similar results (e.g. Wilhelm *et al.* 1999; Lindeman *et al.* 2000).

**Sociodemographic variables**

No sociodemographic variable remained in the final logistic model. This is especially interesting for the gender variable because prevalence

studies report a higher risk of developing depression in females (see Culbertson, 1997; Bebbington, 1998 for recent reviews). Many authors also did not find significant gender differences in primary care or community samples (e.g. Wright *et al.* 1980; Kaplan *et al.* 1987; Salokangas & Poutanen, 1998; Schoevers *et al.* 2000). Culbertson (1997) points out that cross-cultural assessments are needed to understand the multiple factors that contribute to depression. By including samples from different countries and thereby probably including different gender specific social role standards, our study could not show any significant gender differences. A study by Wilhelm & Parker (1989) highlights the possibility that social factors are of key relevance for the development of a depressive episode (but see Harris *et al.* 1991). Our study gives indirect support for their finding. A further analysis of the data presented herein was conducted by Maier *et al.* (1999), who examined gender differences in the prevalence of depression. They found that the gender ratio is nearly constant with 1:2 in the different cultural contexts. Matching social role variables (marital status, children, employment status) between females and males reduced the female excess by about 50% across all centres.

Patients with the diagnosis of a depressive episode at follow-up were slightly older than those who remained non-depressive, but this difference did not reach statistical significance. Although some studies report a higher risk for older people in general health care and community samples (Salokangas & Poutanen, 1998; Schoevers *et al.* 2000) it is not completely clear whether or not growing old increases the risk for a depressive episode (Lehtinen & Joukamaa, 1994; Roberts *et al.* 1997). Roberts *et al.* (1997) found that normally functioning older adults are at no greater risk than younger adults, but that often age-related health problems or disabilities mediate the higher risk for a depressive episode.

There were significant differences in outcome with regard to the different centres where the study was undertaken: living in Ankara, Ibadan, or Manchester increased the risk of developing a new depressive episode. The WHO study on 'Psychological Problems in General Health Care' has undertaken examinations of reliability for the CIDI-PHC that produced very satisfying results (see above). Therefore, the different numbers of depressive episodes cannot be attributed to such methodological problems. Further research needs to examine which variables mediate the observed centre effects. Moreover, it would be an interesting task to determine risk factors for the non-remission of depression for every single centre. This was not possible because of small numbers of patients depressed at follow-up in individual centres.

The rate of newly depressed patients reported in this study was relatively high (7·6%). Other studies found considerably smaller incidence rates (e.g. Murphy *et al.* 1988, 2·1 per 1000 person years in men and 2·5 per 1000 person years in women; Eaton *et al.* 1989, 11·0 per 1000 person years in men and 19·8 per 1000 person years in women; Rorsman *et al.* 1990, 4·3 per 1000 person years in men and 7·6 per 1000 person years in women). Our high incidence rate is probably due to the highly selected sample, which was under high risk of developing a depressive episode. On the other hand, the calculated incidence rate after considering selection procedures before the baseline and the follow-up assessment by calculating of weights is still high at 4·4%. This high rate may be explained by the fact that we examined a primary care sample.

The WHO study on 'Psychological Problems in General Health Care' made it possible to examine prospectively many different variables, which are probably related to depression development in a primary care sample. Those variables, which remained in the final logistic model, have proved their significance against many other variables and are therefore the most relevant predictors. The general practitioners should be careful in their consideration. Of course, there are still interesting variables that have to be examined in culturally heterogeneous samples (e.g. personality factors, variables of the social environment, or genetic loading). The selection of variables in our study can be explained by the aim of the study, namely to examine risk factors for depressive episodes in a primary care sample. We had to consider variables that can be recorded by the general practitioner without a great expenditure of time. The second reason for the selection of variables lies in the feasibility of recording them in a large international sample. The use of other instruments (e.g. questionnaires) to record additional

social and psychological factors would have additionally strained the patients and would probably have resulted in higher non-response rates. The inclusion of additional variables remains a task for future research.

**Limitations**

After discussing the findings in detail we need to acknowledge some limitations of the present study. One major problem arises from the stratification procedures before the baseline and the follow-up assessment. The preferred selection of patients with high GHQ-scores for the baseline assessment and patients with mental disorders for the follow-up assessment resulted in a sample under high risk to develop a depressive episode (or other psychiatric disorders). This also becomes evident in the fact that patients from the high GHQ stratum show nearly the same risk factors (after correction for age, sex and all centres) for a depressive episode as the whole sample (years of formal education (not significant), Ankara (significant), recognition by the general practitioner (significant), diagnostic status (significant), chronic organic diseases (significant)) while patients from the low and the medium GHQ strata had less significant but equivalent risk factors. Of course, smaller sample sizes in the low and medium GHQ strata prevent the authors from definite statements with regard to risk factors in these strata. Nevertheless, we have to acknowledge that our sample does not represent a normal primary care sample. The problem was partly reduced by including the GHQ score (at the screening) and the diagnostic status (at the baseline assessment) as potential risk factors in the logistic regression analysis. These two variables exerted great influence in the final model but also the other identified variables turned out to be important risk factors. Further research that applies prospective designs in primary health care attenders should examine samples which are representative for primary care attenders. Nevertheless, the risk factors obtained in a high risk sample are of major relevance for the general practitioner because especially in high risk patients one has to be attentive to additional risk factors.

It is possible that some patients had a short remitted depressive episode during the follow-up interval, which was not assessed because we have insufficient information about the follow-up interval. Nevertheless, the effect of this lack of information should be quite small because most depressive episodes show a rather long duration. The second problem, which arises from lack of information about the follow-up interval is that the incidence rate reported herein cannot be viewed as the exact 1 year incidence rate because we cannot make a statement about short depressive episodes that occurred and remitted during the follow-up interval.

Our outcome variable was measured in a binary way. Although dimensional recording would have come nearer to reality the CIDI-PHC does not allow for the dimensional recording of mental disorders. Moreover, in the scope of this large international investigation it was not feasible to employ additional questionnaires particularly since questionnaires would have represented an additional loading for the patients which presumably would have resulted in reduced response rates. To account for the full variation of depressive episodes further research has to apply dimensional measures of depression as was done in several previously conducted studies with community and psychiatric patient samples (e.g. Wilhelm & Parker, 1989; Haggerty *et al*. 1993; Ball *et al*. 1994; Richards *et al*. 1997).

Although the present study examined a large international sample separate analyses for each single centre were not performed. This was not possible because sample sizes in every single centre were too small in relation to the number of variables to be examined. Although we incorporated all centres in the logistic-regression analysis as additional variables we did not examine whether there are different risk factors for different cultures or – as we implicitly assumed in our analyses – whether the risk factors have the same effect in each site. Further research has to investigate this problem.

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## REFERENCES


Andrews, G., Anstey, K., Brodaty, H., Issakidis, C. & Luscombe, G. (1999). Recall of depressive episodes 25 years previously. *Psychological Medicine* **29**, 787–791.

Ball, S. G., Otto, M. W., Pollack, M. H. & Rosenbaum, J. F. (1994). Predicting prospective episodes of depression in patients with panic disorder: a longitudinal study. *Journal of Consulting and Clinical Psychology* **62**, 359–365.

Bebbington, P. E. (1998). Sex and depression. *Psychological Medicine* **28**, 1–8.

Brown, F. W., Golding, J. M. & Smith, G. R. (1990). Psychiatric comorbidity in primary care somatisation disorder. *Psychosomatic Medicine* **52**, 445–451.

Coryell, W., Endicott, J. & Keller, M. (1992). Major depression in a nonclinical sample. Demographic and clinical risk factors for first onset. *Archives of General Psychiatry* **49**, 117–125.

Culbertson, F. M. (1997). Depression and gender. An international review. *American Psychologist* **52**, 25–31.

Division of Mental Health (1990). *CIDI-Core. Composite International Diagnostic Interview, Core Version 1.0, November 1990*. Geneva: WHO.

Eaton, W. W., Kramer, M., Anthony, J. C., Dryman, A., Shapiro, S. & Locke, B. Z. (1989). The incidence of specific DIS/DSM-III mental disorders: data from the NIMH Epidemiologic Catchment Area Program. *Acta Psychiatrica Scandinavica* **79**, 163–178.

Forsell, Y. (2000). Predictors for depression, anxiety and psychotic symptoms in a very elderly population: data from a 3-year follow-up study. *Social Psychiatry and Psychiatric Epidemiology* **35**, 259–263.

Goldberg, D. P. & Williams, P. (1988). *A User's Guide to the General Health Questionnaire: GHQ*. NFER-NELSON: Windsor.

Haggerty, J. J., Stern, R. A., Mason, G. A., Beckwith, J., Morey, C. E. & Prange, A. J. (1993). Subclinical hypothyroidism: a modifiable risk factor for depression? *American Journal of Psychiatry* **150**, 508–510.

Harris, T., Surtees, P. & Bancroft, J. (1991). Is sex necessarily a risk factor to depression? *British Journal of Psychiatry* **158**, 708–712.

Horwath, E., Johnson, J., Klerman, G. L. & Weissman, M. M. (1992). Depressive symptoms as relative and attributable risk factors for first-onset major depression. *Archives of General Psychiatry* **49**, 817–823.

Kaplan, G. A., Roberts, R. E., Camacho, T. C. & Coyne, J. C. (1987). Psychosocial predictors of depression. Prospective evidence from the human population laboratory studies. *American Journal of Epidemiology* **125**, 206–220.

Katon, W. (1987). The epidemiology of depression in medical care. *International Journal of Psychiatry in Medicine* **17**, 93–112.

Katon, W. & Schulberg, H. (1992). Epidemiology of depression in primary care. *General Hospital Psychiatry* **14**, 237–247.

Kendler, K. S., Gardner, C. O. & Prescott, C. A. (2001). Are there sex differences in the reliability of a lifetime history of major depression and its predictors? *Psychological Medicine* **31**, 617–625.

Lehtinen, V. & Joukamaa, M. (1994). Epidemiology of depression: prevalence, risk factors and treatment situation. *Acta Psychiatrica Scandinavica* (Suppl. 377), 7–10.

Lindeman, S., Hämäläinen, J., Isometsä, E., Kaprio, J., Poikolainen, K., Heikkinen, M. & Aro, H. (2000). The 12-month prevalence and risk factors for major depressive episode in Finland: representative sample of 5993 adults. *Acta Psychiatrica Scandinavica* **102**, 178–184.

Maier, W., Gänsicke, M., Gater, R., Rezaki, M., Tiemens, B. & Florenzano Urzúa, R. (1999). Gender differences in the prevalence of depression: a survey in primary care. *Journal of Affective Disorders* **53**, 241–252.

Maj, M., Veltro, F., Pirozzi, R., Lobrace, S. & Magliano, L. (1992). Pattern of recurrence of illness after recovery from an episode of major depression: a prospective study. *American Journal of Psychiatry* **149**, 795–800.

Murphy, J. M., Olivier, D. C., Monson, R. R., Sobol, A. M. & Leighton, A. H. (1988). Incidence of depression and anxiety: the Stirling County Study. *American Journal of Public Health* **78**, 534–540.

Ormel, J., Von Korff, M., Üstün, T. B., Pini, S., Korten, A. & Oldehinkel, T. (1994). Common mental disorders and disability across cultures. Results from the WHO Collaborative Study on Psychological Problems in General Health Care. *Journal of the American Medical Association* **272**, 1741–1748.

Pincus, H. A., Tanielian, T. L., Marcus, S. C., Olfson, M., Zarin, D. A., Thompson, J. & Magno Zito, J. (1998). Prescribing trends in psychotropic medications. Primary care, psychiatry, and other medical specialties. *Journal of the American Medical Association* **279**, 526–531.

Pini, S., Perkonnig, A., Tansella, M. & Wittchen, H.-U. (1999). Prevalence and 12-month outcome of threshold and subthreshold mental disorders in primary care. *Journal of Affective Disorders* **56**, 37–48.

Regier, D. A., Narrow, W. E., Rae, D. S., Manderscheid, R. W., Locke, B. Z. & Goodwin, F. K. (1993). The de facto US mental and addictive disorders service system. Epidemiologic Catchment Area Prospective 1-year prevalence rates of disorders and services. *Archives of General Psychiatry* **50**, 85–94.

Richards, M., Hardy, R. & Wadsworth, M. (1997). The effects of divorce and separation on mental health in a national UK birth cohort. *Psychological Medicine* **27**, 1121–1128.

Roberts, R. E., Kaplan, G. A., Shema, S. J. & Strawbridge, W. J. (1997). Does growing old increase the risk for depression. *American Journal of Psychiatry* **154**, 1384–1390.

Rorsman, B., Gräsbeck, A., Hagnell, O., Lanke, J., Öhman, R., Öjesjö, L. & Otterbeck, L. (1990). A prospective study of first-incidence depression. The Lundby Study, 1957–72. *British Journal of Psychiatry* **156**, 336–342.

Sakado, K., Kuwabara, H., Sato, T., Uehara, T., Sakado, M. & Someya, T. (2000). The relationship between personality, dysfunctional parenting in childhood, and lifetime depression in a sample of employed Japanese adults. *Journal of Affective Disorders* **60**, 47–51.

Salokangas, R. K. R. & Poutanen, O. (1998). Risk factors for depression in primary care. Findings of the TADEP project. *Journal of Affective Disorders* **48**, 171–180.

Sartorius, N., Üstün, T. B., Costa e Silva, J.-A., Goldberg, D., Lecrubier, Y., Ormel, J., Von Korff, M. & Wittchen, H.-U. (1993). An international study of psychological problems in primary care. Preliminary report from the World Health Organization collaborative project on ' Psychological Problems in General Health Care'. *Archives General Psychiatry* **50**, 819–824.

Schoevers, R. A., Beekman, A. T. F., Deeg, D. J. H., Geerlings, M. I., Jonker, C. & Van Tilburg, W. (2000). Risk factors for depression in later life; results of a prospective community based study (AMSTEL). *Journal of Affective Disorders* **59**, 127–137.

Solomon, D. A., Keller, M. B., Leon, A. C., Mueller, T. I., Lavori, P. W., Shea, M. T., Coryell, W., Warshaw, M., Turvey, C., Maser, J. D. & Endicott, J. (2000). Multiple recurrences of major depressive disorder. *American Journal of Psychiatry* **157**, 229–233.

Üstün, T. B. & Sartorius, N. (eds.) (1995). *Mental Illness in General Health Care. An International Study*. Chichester: Wiley.

Üstün, T. B. & Von Korff, M. (1995). Primary mental health services: access and provision of care. In *Mental Illness in General Health Care. An International Study* (ed. T. B. Üstün and N. Sartorius), pp. 347–360. Wiley: Chichester.

Van den Berg, M. D., Oldehinkel, A. J., Brilman, E. I., Bouhuys, A. L. & Ormel, J. (2000). Correlates of symptomatic, minor and major depression in the elderly. *Journal of Affective Disorders* **60**, 87–95.

Verdoux, H., Van Os, J., Maurice-Tison, S., Gay, B., Salamon, R. & Bourgeois, M. L. (1999). Increased occurence of depression in psychosis-prone subjects: a follow-up study in primary care settings. *Comprehensive Psychiatry* **40**, 462–468.

Von Korff, M. & Üstün, T. B. (1995). Methods of the WHO collaborative study on 'Psychological Problems in General Health Care'. In *Mental Illness in General Health Care. An International Study* (ed. T. B. Üstün and N. Sartorius), pp. 19–38. Wiley: Chichester.

Wiersma, D., Jong, A. & Ormel, J. (1988). The Groningen Social Disability Schedule: development, relationship, with I.C.I.D.H., and psychometric properties. *International Journal of Rehabilitation Research* **11**, 213–224.

Wilhelm, K. & Parker, G. (1989). Is sex necessarily a risk factor to depression? *Psychological Medicine* **19**, 401–413.

Wilhelm, K., Parker, G., Dewhurst-Savellis, J. & Asghari, A. (1999). Psychological predictors of single and recurrent major depressive episodes. *Journal of Affective Disorders* **54**, 139–147.

Wohlfarth, T. D., van den Brink, W., Ormel, J., Koeter, M. W. J. & Oldehinkel, A. J. (1993). The relationship between social dysfunctioning and psychopathology among primary care attenders. *British Journal of Psychiatry* **163**, 37–44.

World Health Organization (WHO) (1992). *The ICD-10 Classification of Mental and Behavioural Disorders. Clinical Descriptions and Diagnostic Guidelines*. Geneva: WHO.

Wright, J. H., Bell, R. A., Kuhn, C. C., Rush, E. A., Patel, N. & Redmon, J. E. (1980). Depression in family practice patients. *Southern Medical Journal* **73**, 1031–1034.